

Glottal stops and compensatory lengthening

There are several cases described in the literature when the deletion of glottal stops causes historical or synchronic compensatory lengthening (CL) of surrounding vowels, as, for example, in Tehrani Farsi (Indo-European), Ket (isolate language of Siberia), Leti (Austronesian), Wanka Quechua (Quechuan), Mohawk (Iroquoian), Klamath (Penutian), Bella Coola (Salish), Choktaw (Muskogean), etc. In this study I concentrate on the microparametric variation in respect to the glottal stop loss with CL, addressing the differences between formal and colloquial registers of Tehrani Farsi (1) and free variation in Ket (2).

The fact that the deletion of glottal stops can be correlated with CL is rather puzzling. Firstly, glottal stops are the only members of the stop class whose deletion causes CL. All other cases of CL though loss of stops involve either degemination (Indic languages) or templatic (morphologically conditioned) alternations, which follow from the restrictions on gemination of certain consonants, including glottal stop (Semitic). Secondly, glottal stops do not share phonetic characteristics with segments which do trigger vowel lengthening, such as glides, liquids or fricatives (Kavitskaya 2001). It is well known that voiced stops often cause lengthening of the preceding vowels, as was shown for English as well as other languages (Rietveld and Frauenfelder 1987, Kluender 1988, among others), but only glottal stops regularly participate in CL alternations, and, since they have a shortening effect on the preceding vowel, it is hard to explain why their loss should result in vowel lengthening.

The solution to this puzzle is obtained by closer examination of entities which are traditionally called “glottal stops”. I argue that glottal segments whose deletion triggers CL are always vocalic or approximant-like, and the deletion of true phonetic glottal stops never causes vowel lengthening. Furthermore, the deletion of glottal segments which are *phonologically stops* is predicted not to result in CL. Phonetic facts support this analysis.

Examination of the phonetic data from two speakers of Tehrani Farsi showed that in the formal register glottal segments in question are in fact glottal approximants, as the spectrogram in (3) illustrates. The shape of the vocal tract in a glottal approximant is that of surrounding vowels, parallel to what is observed for *h*, which results in its being misheard by the listeners as a part of the vowel, facilitating its loss with CL in the colloquial register. Additionally, glottal stops delete with CL in colloquial Tehrani Farsi when they are the second consonant in the coda (4). I analyze these aberrant typological data as going through an intermediate stage $CV?C < *CVC?$ before the actual CL sound change. Synchronically, however, this series of changes produces $CVC? \sim CV:C$ variation which involves lengthening as a result of a loss of a mora-bearing segment.

The data from Ket provides additional support for this analysis. Dulzon (1964) describes glottal stops in Ket as freely alternating with vowels. I argue that the synchronic variation in Ket mirrors the diachronic fate of the glottal stops. They fluctuate between glottal approximants and vowels; when they surface as vowels, monophthongization completes the CL process.

The analysis just proposed predicts that only the deletion of certain kinds of glottal segments, namely, phonological approximants will result in CL. Synchronically, glottal approximants which result in CL are predicted to be moraic, while glottal stops whose deletion does not trigger CL are predicted to be weightless (Hayes 1989). The moraicity becomes important in languages which allow only certain kinds of codas to be weight-bearing (Zec 1995). If a variety of possible phonetic realizations of glottal stops potentially corresponds to different phonological representations in respect to their moraic status, glottal stop is predicted to occupy different places in the sonority hierarchy in different languages. This prediction is supported by the cross-linguistic observations on the distribution of glottal stops. In some languages (e.g. Karok), glottal stop patterns with sonorants since it is an approximant, and in others (e.g. Kwakwaka) it patterns with obstruents since it is a true stop.

Finally, the analysis of so-called glottal stops as phonologically either stops or approximants proposed here predicts that there may be languages which contrast these two types of glottal segments. Indeed, in Gimi (5) the two types of glottals (*ʔ* and ***) are described as phonologically contrastive by Ladefoged and Maddieson (1996).

Data:

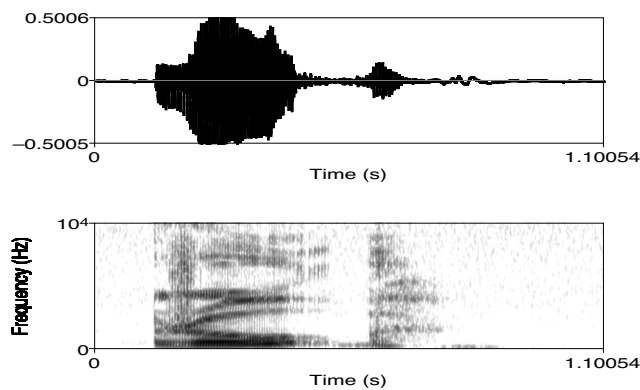
(1) Tehrani Farsi (Darzi 1991)

Formal	Colloquial	
teʔmir	te:mir	'repair'
suʔ	su:	'bad'
roʔb	ro:b	'terror'
læʔn	læ:n	'cursing'

(2) Ket (Dulzon 1964)

biʔlʲ ~ bielʲ ~ bi:lʲ	'far'
iʔt ~ iet ~ i:t	'birch-bark box'
kuʔsʲ ~ kuosʲ	'wigwam'
keʔ ~ keə ~ ke:	'big'
kaʔt ~ ka:t	'parka'
daʔskantʲə ~ da:skantʲə	'she narrates'

(3) Tehrani Farsi: [roʔb] 'terror' (formal speech)



(4) Tehrani Farsi (Darzi 1991)

Formal	Colloquial	
robʔ	ro:b	'quarter'
ʃæmʔ	ʃæ:m	'candle'

(5) Gimi (Papuan) (Maddieson 1996)

haʔo	'shut'
ha*oʔ	'many'
hao	'hit'

Selected references

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